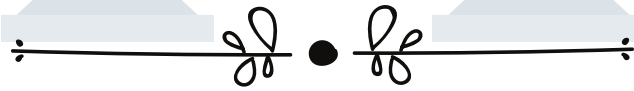


BIOHACK NOTES



MINERAL NUTRITION

- BASED ON ACTIVE RECALL AND SPACED REPETITION
- TARGET 360/360 IN NEET BIOLOGY & 100/100 IN BOARDS!



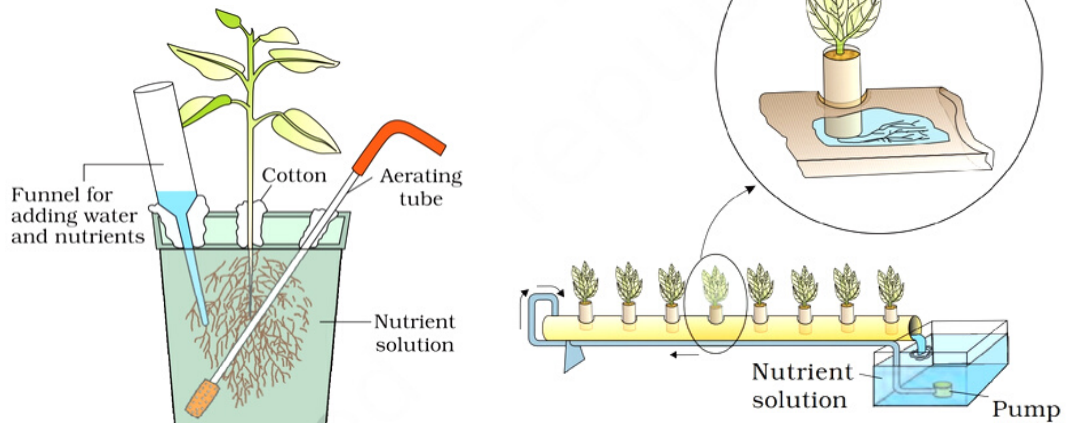
PARTH GOYAL





• INTRODUCTION

1. _____, a prominent German/British botanist, demonstrated that plants could be grown to maturity in a defined nutrient solution in complete absence of soil.
2. Technique of growing plant in nutrient solution known as _____
3. Hydroponics is successfully employed as a technique for the commercial production of vegetables such as _____, _____, _____, _____
4. Given diagram is showing which technique-



5. More than _____ elements of the 105 discovered so far are found in different plants.
6. The criteria for essentiality are - (3)
7. Macronutrients are present in plant tissues in more than _____ mmole/Kg of dry matter.
8. Macronutrients example (9)
9. Micronutrients are present less than 10 _____ (tell the unit) of dry matter.
10. Micronutrients example (8)
11. Carbon, hydrogen and oxygen are mainly obtained from CO_2 and H_2O . (T/F)
12. Beneficial elements ex (4)
13. Essential elements can be grouped into 4 categories on the basis of function. Name them.
14. Essential elements as component of biomolecules - (4)
15. Essential elements as component of energy related compounds - (2)
16. Mg^{2+} is the activator of _____ and _____
17. Activator of alcohol dehydrogenase is _____
18. Activator of nitrogenase is _____
19. Sodium plays an important role in the opening and closing of stomata. (T/F)





• ROLE OF MACRO AND MICRO NUTRIENTS

20. Essential element required in largest amount is _____
21. Nitrogen mainly absorbed mainly as _____ though some are also taken as _____ or _____
22. _____ is one of the major constituents of proteins, nucleic acids, vitamins and hormones.
23. _____ is a constituent of cell membranes, certain proteins, all nucleic acids and nucleotides. (NEET)
24. Phosphorus is absorbed in the form of _____ or _____
25. _____ is required in more abundant quantities in the meristematic tissues, buds, leaves and root tips.
26. Maintenance of the turgidity of cells is function of _____ element. (NEET)
27. Potassium is involved in protein synthesis. T/F
28. Maintenance of anionic-cationic balance is done by _____
29. Tell all the functions of K. (5)
30. _____ is required in meristematic and differentiating cells. (NEET)
31. During cell division, _____ is used in the synthesis of cell wall, particularly as _____ in the middle lamella.
32. Magnesium is also needed during the formation of mitotic spindle. (T/F)
33. _____ is involved in the synthesis of DNA and RNA.
34. Magnesium is a constituent of the ring structure of chlorophyll. T/F (NEET)
35. Ribosome structure is maintained by _____
36. Plants obtain sulphur in the form of SO_3^{2-} . T/F
37. Sulphur is present in two amino acids - (NEET)
38. Sulphur is main constituent of several _____, vitamins (tell 3 examples), _____
39. Plant obtain iron in the form of Fe^{2+} . T/F (NEET)
40. Iron is constituents of which proteins? (2)
41. Zn is an activator of enzyme catalase. (T/F)
42. Iron is essential for the formation of _____
43. Manganese is absorbed in the form of _____
44. Manganese activate many enzymes involved in _____, _____, _____
45. Element used in splitting of water to liberate oxygen during photosynthesis is (NEET)
46. Activator of enzyme carboxylase is
47. Zn is also needed in the synthesis of _____ (NEET)



48. Cu is absorbed as Cu^+ ions. (T/F)

49. Boron is absorbed as _____ or _____

50. Calcium is required for uptake and utilization of boron. (T/F)

51. Fxns of boron (6)

52. Molybdenum is obtained as _____

53. Anion cation balance is determined by Na, K, Cl. (T/F)

54. Molybdenum is a component of several enzymes. Name them. (2) (NEET)



• DEFICIENCY SYMPTOMS OF ESSENTIAL ELEMENTS

55. Define critical concentration.

56. _____, _____, _____ deficiency are visible first in the senescent leaves. (NEET)

57. _____ and _____ deficiency comes in younger leaves.

58. What happens in chlorosis ?

59. Deficiency of which elements happen in chlorosis ? (8)

60. Necrosis occurs due to deficiency of - (4)

61. Inhibition of cell division is caused due to (4)

62. Elements which delay flowering are (3)

63. How do we define toxicity of element ?

64. Appearance of brown spots surrounded by chlorotic veins is a feature of _____ toxicity.

65. Manganese compete with _____ and _____ for uptake and with _____ for binding with enzymes.

66. Mn inhibit _____ translocation to _____

67. Manganese toxicity can cause deficiency of _____, _____ and _____



• METABOLISM OF NITROGEN

68. The movement of ions is called _____

69. _____ is the most prevalent element in the living organism.

70. _____ is a limiting nutrient for both agricultural and natural ecosystems.

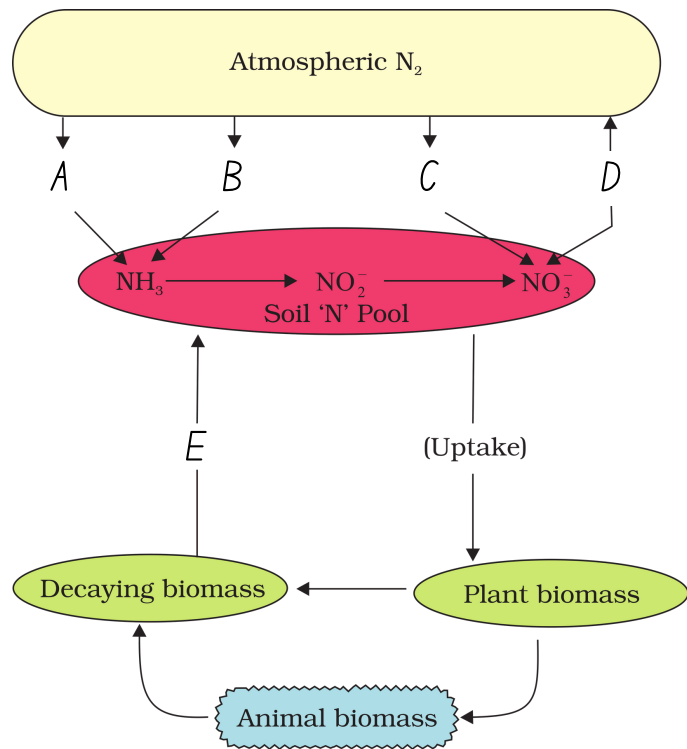
71. What is nitrogen fixation ?

72. In nature, lightning and ultraviolet radiation provide enough energy to convert nitrogen to _____, _____, _____

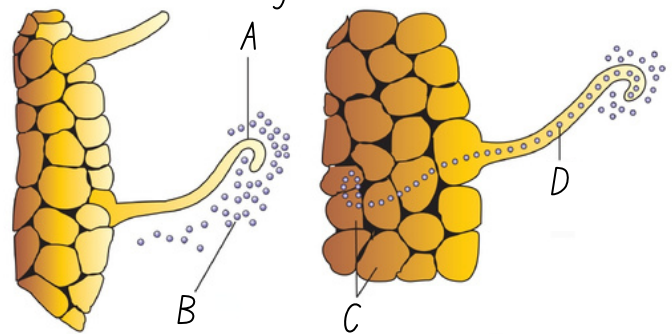


DigaQ. 1

73. Ammonia is oxidised to nitrite by bacteria _____ and _____ (NEET)
74. Nitrite is further oxidized to nitrate with the help of _____ (NEET)
75. The above two steps are called _____
76. The above bacteria are chemoautotrophs/chemoheterotrophs. (NEET)
77. Denitrifying bacteria are (2)
78. _____ enzyme is used in biological nitrogen fixation.
79. Free living nitrogen fixing aerobic microbes are _____ and _____ while anaerobic microbe is _____ (NEET)
80. Cyanobacterial like _____ and _____ are also free living nitrogen fixers.
81. Bacillus is a symbiotic nitrogen fixer. T/F
82. Rhizobium is a _____ shaped bacteria.
83. Rhizobium have relationship with roots of several legumes like (7)
84. _____ are small outgrowths on root.
85. _____ produces nitrogen fixing nodules on the root of non - leguminous plant.
86. Ex of non-leguminous plant.
87. Central portion of nodule is pink due to presence of _____
88. The enzyme nitrogenase is a _____ protein which catalyze conversion of _____ to _____
89. First stable product of nitrogen fixation is _____
90. The bacteria get modified into rod shaped _____ and cause _____ and _____ cells to divide.
91. 40 moles of ATP produce _____ moles of NH_3 .
92. The enzyme nitrogenase is highly sensitive to aerobic conditions. T/F (NEET)
93. The nodule contains an oxygen scavenger called _____ to protect the enzyme. (NEET)
94. The energy for nitrogen fixation is taken from plant/bacteria.
95. Two ways to produce amino acids are -
96. Identify the enzyme in this reaction.
97. Two most important amides found in plants are _____ and _____
98. Amides are transported to other part by phloem. T/F
99. The nodules of soybean export the fixed nitrogen as _____
100. _____ have high nitrogen to carbon ratio.



DigaQ. 2



PARTH GOYAL

MINERAL NUTRITION



PARTH GOYAL



ANSWERS



• ANSWERS

- 1) Julius Von Sachs, German
- 2) Hydroponics
- 3) Tomato, seedless cucumber and lettuce
- 4) Hydroponics
- 5) 60
- 6) I. Absolute necessity, in the absence it should not complete its life cycle, II. Requirement of element must be specific and non replaceable, III. must be directly involved in metabolism
- 7) 10 8) Ca, Mg, S, N, P, K, C, H, O
(Mnemonic - Calcium Mange Sulphur se NPK or CHONSPK Ca, Mg)
- 9) mmole /Kg
- 10) Zn, Fe, Mn, Cu, Mo, B, Cl, Ni (Mnemonic - Zara Fer se Man Cu Mohobaad Cal Ni)
- 11) T
- 12) Sodium, Cobalt, Silicon, Selenium
(Mnemonic - Repeatedly say Na,co,si,se 50 times, it is such a fun name you will instantly remember it)
- 13) Components of structural elements, components of energy related chemical compounds, activate or inhibit enzymes, alter osmotic potential
- 14) C, H, O, N
- 15) Mg, P
- 16) Rubisco, PEP
- 17) Zn^{2+} 18) Mo 19) F

• ROLE OF MACRO & MICRO NUTRIENTS

- 20) N
- 21) NO_3^- , NO_2^- and NH_4^+
- 22) N 23) P
- 24) $H_2PO_4^-$ or HPO_4^{2-}
- 25) K 26) K 27) T 28) K

- 29) Maintain anion-cation balance, involved in protein synthesis, opening & closing of stomata, activation of enzymes, maintenance of turgidity
- 30) Ca 31) Ca, calcium pectate
- 32) F, Ca is needed for formation of mitotic spindle
- 33) Mg 34) T
- 35) Mg 36) F, SO_4^{2-}
- 37) Cysteine, methionine
- 38) Coenzymes, Vitamin - thiamine, biotin, coenzyme A, ferredoxin
- 39) F, Fe^{3+}
- 40) Ferredoxin, cytochromes
- 41) F, Iron is activator
- 42) Chlorophyll
- 43) Mn^{2+}
- 44) Photosynthesis, respiration and nitrogen metabolism
- 45) Mn, Cl 46) Zn 47) Auxin
- 48) F, Cu^{2+} 49) BO_3^{3-} , $B_4O_7^{2-}$
- 50) F, vice versa is true
- 51) For uptake and utilisation of Ca^{2+} , membrane functioning, pollen germination, cell elongation, cell differentiation and carbohydrate translocation.
- 52) MoO_4^{2-} 53) T
- 54) Nitrogenase, nitrate reductase

• DEFICIENCY SYMPTOMS OF ESSENTIAL ELEMENTS

- 55) The concentration of the essential element below which plant growth is retarded is termed as critical concentration
- 56) N, K, Mg 57) Ca, S
- 58) Loss of chlorophyll leading to yellowing of leaves



PARTH GOYAL

- 59) Na, K, Fe, Mn, Se, Zn, Mo, Mg (Mnemonic - Napoleon kaka Iron Man Se Zuta Moja Manga)
- 60) Ca, Mg, Cu, K (Mnemonic - Car Me Cutta Kata)
- 61) Mo, S, K, N (Mnemonic - MuSKaN)
- 62) Mo, S, N (Mnemonic - MuSaNa)
- 63) reduces the dry weight of tissues by about 10 % is considered toxic.
- 64) Mn 65) Fe, Mg, Mg
- 66) Ca, shoot apex
- 67) Fe, Mg, Ca 68) Flux
- 69) N 70) N
- 71) The process of conversion of N_2 to NH_3
- 72) NO, NO_2 , N_2O
- 73) Nitrosomonas, Nitrococcus
- 74) Nitrobacter

• METABOLISM OF NITROGEN

- 75) Nitrification
- 76) Chemoautotrophs
- 77) Pseudomonas, Thiobacillus
- 78) Nitrogenase
- 79) Azotobacter, Beijernickia while anaerobic is Rhodospirillum
- 80) Anabaena, Nostoc
- 81) F 82) Rod
- 83) alfalfa, sweet clover, sweet pea, lentils, garden pea broad bean, clover beans

- 84) Nodules
- 85) Frankia
- 86) Alnus
- 87) Leg haemoglobin
- 88) Mo-Fe, N_2 to NH_3
- 89) NH_3
- 90) Bacteroides, inner cortical and pericycle
- 91) 5
- 92) T
- 93) Leg haemoglobin
- 94) Plant
- 95) Reductive amination, transamination
- 96) Glutamate Dehydrogenase
- 97) Asparagine, glutamine
- 98) F
- 99) Ureides
- 100) ureides
- DigaQs
- | DigaQ. 1 | DigaQ. 2 |
|-------------------------------|---|
| A - Biological N_2 fixation | A - Hook |
| B - Industrial N_2 fixation | B - Bacteria |
| C - Electrical N_2 fixation | C - Inner cortex and pericycle cells under division |
| D - Denitrification | |
| E - Ammonification | D - Infection thread containing bacteria |



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CONTENT FOR YOU!

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COACHING INSTITUTES AFTER SOME
YEARS WHEN WHOLE QUALITY
EDUCATION WILL BE FREE

